Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte TOSHIYUKI ZAITSU

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Appeal No. 2000-2255
Application No. 09/123,522

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ON BRIEF

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Before KRASS, RUGGIERO, and LALL, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the final rejection of claims 1-11, which are all of the claims pending in the present application. Amendments filed September 30, 1999 (Paper No. 7) and December 10, 1999 (Paper No. 10) after final rejection were approved for entry by the Examiner.

The claimed invention relates to a DC/DC converter including a switching device for converting a DC voltage into an AC voltage. Further included is a piezoelectric transformer which

changes the AC voltage from an input waveform having any duty cycle into an output sinusoidal waveform with a 50% duty cycle in which a time ratio of positive and negative half cycles are identical. A current doubler type rectification-smoothing circuit receives the output sinusoidal waveform from the piezoelectric transformer and produces an output having zero-ripple current.

Claim 1 is illustrative of the invention and reads as follows:

> 1. A DC/DC converter comprising:
>
> a switch for converting a DC voltage into an AC voltage;
>
> a piezoelectric transformer for changing said AC voltage from an input waveform with any duty into an output sinusoidal waveform with a 50% duty in which a time ratio of positive and negative half cycles are identical; and
>
> a current doubler (Double Ended Converter using Two Inductors) type rectification-smoothing circuit that receives the output sinusoidal waveform from the piezoelectric transformer and outputs zero-ripple current.

The Examiner relies on the following prior art:

Newton et al. (Newton)	5,663,876	Sep. 02, 1997 (filed Sep. 25, 1995)
Zaitsu	5,739,622	Apr. 14, 1998 (filed Aug. 05, 1996)

Claims 1-11 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over Newton in view of Zaitsu.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the Brief (Paper No. 15) and Answer (Paper No. 17) for the respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellant's arguments set forth in the Brief along with the Examiner's rationale in support of the rejection and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would have suggested to one of ordinary skill in the art the obviousness of the invention as set forth in claims 1, 6, 7, and 11. We reach the opposite conclusion with respect to claims 2-5 and 8-10. Accordingly, we affirm-in-part.

As a general proposition in an appeal involving a rejection under 35 U.S.C. § 103, an Examiner is under a burden to make out

a prima facie case of obviousness. If that burden is met, the burden of going forward then shifts to Appellant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1051-52, 189 USPQ 143, 147 (CCPA 1976).

With respect to independent claims 1, 6, and 11, and dependent claim 7, after reviewing the Examiner's analysis set forth at page 4 of the Answer, it is our view that such analysis carefully points out the teachings of the Newton and Zaitsu references, reasonably indicates the perceived differences between this prior art and the claimed invention, and provides reasons as to how and why the prior art teachings would have been modified and/or combined to arrive at the claimed invention. In our opinion, the Examiner's analysis is sufficiently reasonable that we find that the Examiner has at least satisfied the burden of presenting a prima facie case of obviousness. The burden is, therefore, upon Appellant to come forward with evidence and/or

arguments which persuasively rebut the Examiner's prima facie case of obviousness. Only those arguments actually made by Appellant have been considered in this decision. Arguments which Appellant could have made but chose not to make in the Brief have not been considered (see 37 CFR § 1.192(a)).

Appellant's arguments in response assert the failure to set forth a prima facie case of obviousness since proper motivation for the proposed combination of Newton and Zaitsu has not been established. Initially, Appellant contends (Brief, pages 8 and 9) that no motivation exists within Newton to use a piezoelectric transformer such as taught by Zaistsu to achieve zero-ripple current from an input waveform having any duty cycle since Newton is limited to achieving zero-ripple current only with predetermined duty cycle input waveforms. Similarly, Appellant argues (id., at 8 and 9) that Zaitsu provides no suggestion of any combination with Newton since Zaitsu utilizes a bridge rectifier circuit, rather than a current doubler circuit as disclosed by Newton, at the transformer output.

After careful review of the Newton and Zaitsu references in light of the arguments of record, we find Appellant's assertions to be unpersuasive. In our view, Appellant's arguments focus on the individual differences between the limitations of the

appealed claims 1, 6, 7, and 11 and each of the Newton and Zaitsu references. It is apparent, however, from the Examiner's line of reasoning in the Answer, that the basis for the obviousness rejection is the combination of Newton and Zaitsu. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986).

In other words, while Appellant contends that Newton lacks a teaching of using a piezoelectric transformer to convert an input waveform having any duty cycle into a sinusoidal waveform with a 50% duty cycle, this teaching is clearly provided by Zaitsu.[1] Further, although Appellant argues that Zaitsu utilizes a bridge rectifier circuit at the transformer output rather than a current doubler which achieves zero-ripple current, this feature is clearly taught by Newton.

We also find, contrary to Appellant's contention, that the skilled artisan would find ample suggestion in Zaitsu for

[1] We do not necessarily agree with Appellant's characterization of Newton since, although Newton discusses achieving zero-ripple current at a predetermined input waveform duty cycle, this duty cycle is also disclosed as being adjustable (Newton, column 3. Line 63).

combining the disclosed teachings of a piezoelectric transformer, which converts an input waveform into a sinusoid with a 50% duty cycle, with the disclosure of Newton. Our review of Zaitsu reveals a clear discussion of the replacement of electro-magnetic transformers with piezoelectric transformers, the problems attendant with such replacement, and a disclosure of a particular structural arrangement for addressing those problems. Further, with regard to dependent claim 7, we find that both Newton and Zaitsu contemplate application of their disclosed circuitry to systems using commercial AC power with the attendant necessity to rectify and smooth the AC power input to produce a usable DC input voltage applied to their disclosed DC/DC converter structure.

Appellant's position would limit the use of any reference to its express teachings, an assertion we find to be in error. The rationale to modify or combine the prior art does not have to be expressly stated in the prior art; the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. In re Nilssen, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988); Keller, 642 F.2d at

425, 208 USPQ at 881. Further, in considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. In re Preda, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968).

We have also reviewed the declaration filed under 37 CFR § 1.132 by Toshiyuki Zaitsu, the listed inventor in the instant application, in support of the position that the claimed invention is unobvious over the applied prior art. We find nothing in this declaration, which merely sets forth an unsupported expression of opinion as to the question of obviousness over the applied prior art, which would convince us of any error in the Examiner's position. Conclusions drawn from factually unsupported expressions of opinion have little probative value in relation the question of obviousness over prior art references, the ultimate issue to be decided in this appeal.

In view of the above discussion and the totality of the evidence on the record, it is our opinion that the Examiner has established a prima facie case of obviousness which has not been rebutted by any convincing arguments from Appellant.

Accordingly, the Examiner's 35 U.S.C. § 103 rejection of appealed independent claims 1, 6, and 11, as well as dependent claim 7, is sustained.

Turning to a consideration of the Examiner's 35 U.S.C. § 103 rejection of dependent claims 2-5 and 8-10 based on the combination of Newton and Zaitsu, we note that, while we found Appellant's arguments to be unpersuasive with regard to the obviousness rejection of claims 1, 6, 7, and 11 discussed supra, we reach the opposite conclusion with respect to claims 2-5 and 8-10. Claims 2-5 and 8-10 provide a detailed recitation of the circuit structure of the rectification-smoothing circuit as well as of the circuit connections of the piezoelectric transformer to the rectification-smoothing circuit. In addressing the claimed limitations, the Examiner has asserted (Answer, page 5):

> it is well known in the art to utilize any number of various different configurations of the rectification and smoothing circuit to achieve the rectification and smoothing [circuit] process at the output of the circuit and any of these various different configurations of the rectification and smoothing circuit are well within the abilities of one of ordinary skill in the art.

We find no support on the record for these conclusions of the Examiner. Further, even assuming, arguendo, that a variety of rectification-smoothing circuits may be known in the art,

there is no indication from the Examiner as to how such circuits would be connected to a piezoelectric transformer arrangement in order to achieve the specific transformer and rectification-smoothing circuit combination set forth in claims 2-5 and 8-10. The Examiner must not only make requisite findings, based on the evidence of record, but must also explain the reasoning by which the findings are deemed to support the conclusion of obviousness. See In re Lee, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002). Accordingly, since all of the claim limitations are not taught or suggested by the applied Newton and Zaitsu references, the Examiner has not established a prima facie case of obviousness, and the 35 U.S.C. § 103 rejection of dependent claims 2-5 and 8-10 is not sustained.

In summary, with respect to the Examiner's 35 U.S.C. § 103 rejection of the appealed claims, we have sustained the rejection of claims 1, 6, 7, and 11, but have not sustained the rejection of claims 2-5 and 8-10. Therefore, the Examiner's decision rejecting claims 1-11 is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

ERROL A. KRASS Administrative Patent Judge	)	
JOSEPH F. RUGGIERO Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
PARSHOTAM S. LALL Administrative Patent Judge	)	

JFR:hh

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